What is claimed is:

1. A wide-band array antenna comprising:

N × M antenna elements, and

multipliers connected to each said antenna element, each having a real-valued coefficient, wherein

assuming that said elements are placed at distances of d_1 and d_2 in the directions of N and M, respectively, the coefficient of each multiplier is C_{nm}, and by defining two variables as $v=\omega d_1 \sin\theta/c$, and $u=\omega d_2 \cos\theta/c$, the response of said array antenna can be given as:

$$H(u,v) = \sum_{n=1}^{N}\sum_{m=1}^{M} C_{nm} e^{j(n-1)v} e^{-j(m-1)u} \qquad (5)$$

by appropriately selecting points (u_{01}, v_{01}) on the u-v plane according to a predetermined angle of beam pattern and the center frequency of a predetermined frequency band, the elements b_l of an auxiliary vector $B = [b_1, b_2, \ldots, b_L]$ ($L << N \times M$) can be calculated and the coefficient C_{nm} of each said multiplier corresponding to each antenna element can be calculated as follows

$$C_{nm} = \sum_{l=1}^{L} G_a^{-1} b_l e^{-j(n-1)v_{0l}} e^{j(m-1)u_{0l}} \qquad (17)$$

2. A wide-band array antenna as set forth in claim 1, wherein

said each antenna element has a frequency

dependent gain which is the same for all elements.

3. A wide-band array antenna as set forth in claim 1, wherein

the gain of the antenna element has a predetermined value at a predetermined frequency band including the center frequency and at a predetermined angle.

4. A wide-band array antenna as set forth in claim 1, further comprises

an adder for adding the output signals from said multipliers.

5. A wide-band array antenna as set forth in claim 1, wherein

a signal to be sent is input to said multipliers and the output signal of each said multiplier is applied to the corresponding antenna element.

6. A wide-band array antenna as set forth in claim 1, wherein

said selected points (u_{01}, v_{01}) on the u-v plane for computing the elements of said auxiliary vector B are symmetrically distributed on the u-v plane.